



Scaling a BMP data

0. Let suppose we have a counts C for given detector. It is of type byte, range 0-255
1. Value is converted using lookup table:

$$L = \text{lookup_table}[C]$$

lookup_table is simply an array of values, its length is 256. I read it from database table with query

```
SELECT raw_value, scaled_value FROM hendricks.bpm_scaling_table WHERE  
system_id=3 ORDER BY raw_value
```

raw_value range: 0-255, *scaled_value* is something put inside. Fritz Dejongh call it “non-linearity correction”.

2. After that scaled value V is computed using expression:

$$V = L * \text{position_scale_factor} - \text{electrical_offset} + \text{survey_offset}$$

position_scale_factor, *electrical_offset* and *survey_offset* are fields in the table *hendricks.bpm_config_data* and differ for every detector.

3. For several detectors - E2 H 1 (T:HPE24), E2 H 2 (T:HPE26), E2 V 2 (T:VPE25), E2 V 3 (T:VPE27), the expression is different:

$$V = 1E-2 * (128.0 - C) / 0.112 - \text{electrical_offset} + \text{survey_offset}$$

electrical_offset and *survey_offset* are taken from the same table.